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# Ecosystems as a Tool to Circular Economy

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## Circular Economy is Ecosystemic

Circular economy aims at system level optimization for sustainability, by applying lean manufacturing, lean patterns of consumption, dematerializing, and delivering value rather than products. The end goal is to minimize the climate and environmental impact while providing for the needs of the growing population.

By default, systemic optimization and circular transition requires the involvement of different stakeholders, including the industry, the government, and the consumer. In transition to circular practices, discussion and measures need to take place even simultaneously between the industry and the regulator, the citizen and the society, and the company and their customers. Tight cooperation between the stakeholders is needed for the systemic change from linear to circular value networks: A single company cannot create the market or build new value chains on their own, without stakeholder collaboration.

Ecosystems can be used as a cooperation vehicle to circular transition. VTT has studied seven different circular materials oriented ecosystems in Finland to understand the characteristics, the targets, the challenges, the opportunities, and the practical needs towards growth in these ecosystems (Kiertotalouden innovaatioekosysteemit ja arvonaluonnin mahdollisuudet 2018-19 project, funded by TEM and VTT).

Based on ecosystem interviews and literature, the key growth factors in building successful circular materials business include 1) supply and demand in the product market; 2) disruptive solutions; 3) availability of and accessibility to (secondary) raw materials; 4) drive and capability to grow; 5) opportunity to industrial scale / scalability; and 6) ecosystemic orchestration.

## Three Basic Types of Ecosystems

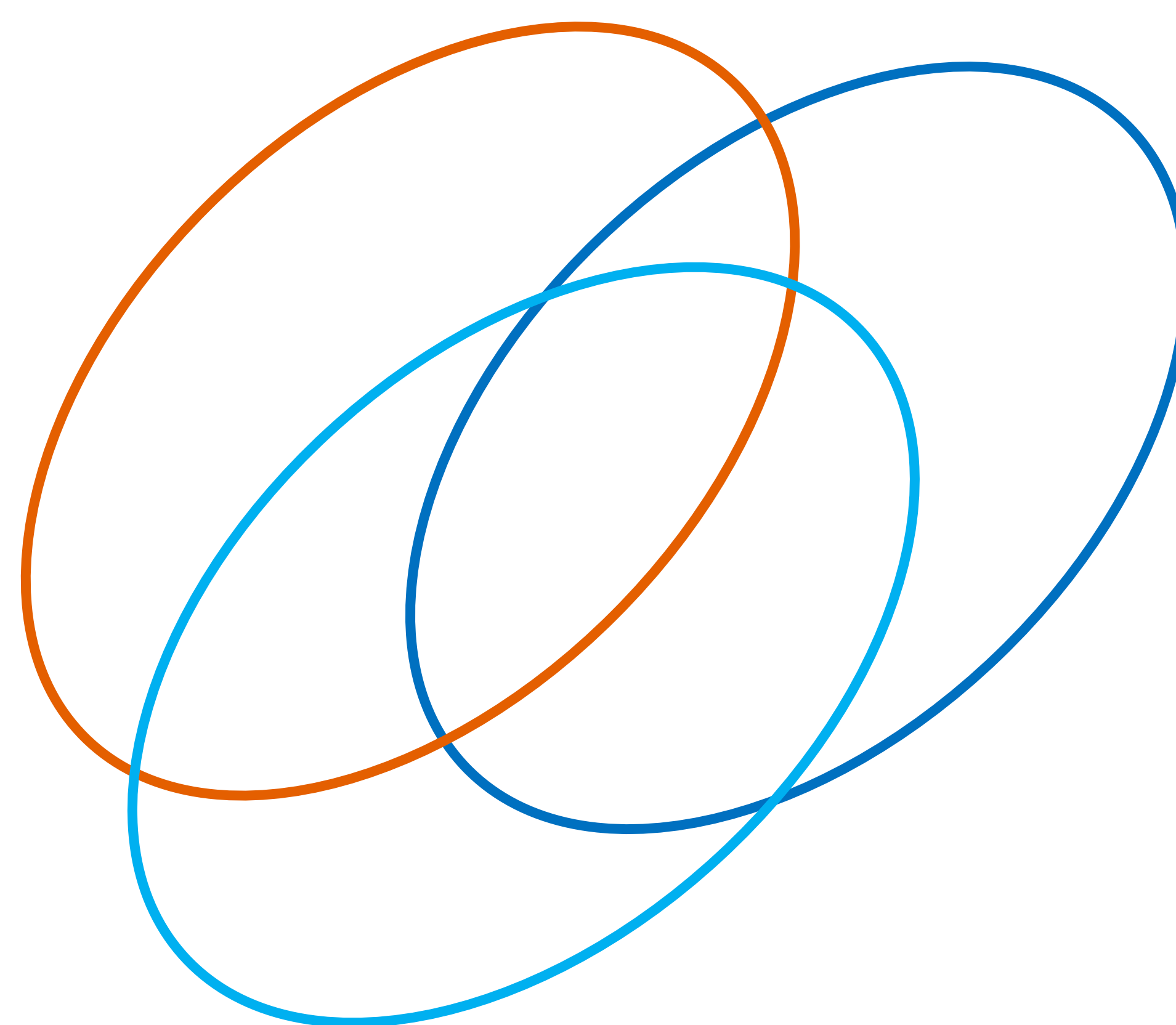
Based on the circular ecosystems' motivations, goals, and characteristics, three basic types of circular ecosystems were recognized: 1) regional growth oriented ecosystems, 2) circular vision driven ecosystems, and 3) industrially operated ecosystems driven by a key company. The regional ecosystems arise from locally or regionally available material streams and regional growth targets and are often facilitated by the local cities or development companies. The circular vision motivated ecosystems strive to build business on solving a national or global challenge, such as textiles recycling. The industrially operated ecosystems support circularity in the context of existing industrial business, driven by regulation or arising customer demand.

## Conclusions

- Regional ecosystems are locally important in value creation but will need specialization to create unique customer value that will provide growth opportunities beyond the regional scope.
- Circular vision driven ecosystems have high potential in creating value but require connecting to industrial know-how and networks to secure investments and true born-global opportunities.
- Industrially operated ecosystems have the resources to enter and influence the markets, but they will need circular strategy implementation through the organization and close collaboration with startup companies for renewal.

### REGIONAL GROWTH ORIENTED ECOSYSTEMS

Ecosystems built on strong local networks. Motivation comes from using locally available material resources and building growth regionally. Local regional developers facilitate operation. The challenge is to grow the business beyond regional boundaries.



### CIRCULAR VISION DRIVEN ECOSYSTEMS

Ecosystems motivated to solve a sustainability challenge by circular business models. Emphasis is on the innovation element. Challenges relate to securing funding for early stage business, setting up the ecosystem and coherent vision, and pushing the transformative idea through the existing value chain.

### INDUSTRIALLY OPERATED ECOSYSTEMS DRIVEN BY A KEY COMPANY

Ecosystems/networks run by traditional industrial companies. Circular activities typically seen as a side activity under the core business. Resource efficiency at the core of circular activity. Strong global companies in the center partnering with local service providers, SMEs and innovative startups. The challenge is to bring disruption to the traditional way of operating.

**Picture 1.** Three basic types of ecosystems by motivation, characteristics and challenges.